

Joseph H. Plona  
Site Vice President

6400 N. Dixie Highway, Newport, MI 48166  
Tel: 734.586.5910 Fax: 734.586.4172

**DTE Energy**



10 CFR 50.73

January 14, 2008  
NRC-08-0002

U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington D C 20555-0001

Reference: Fermi 2  
NRC Docket No. 50-341  
NRC License No. NPF-43

Subject: Licensee Event Report No. 2007-002, "Automatic Initiation of Alternate Rod Insertion and Manual Reactor Scram Due to Perturbations in the Reference Leg Backfill System"

Pursuant to 10 CFR 50.73(a)(2)(iv)(A), Detroit Edison is hereby submitting the enclosed Licensee Event Report (LER) No. 2007-002. This LER documents an automatic initiation of the alternate rod insertion / recirculation pump trip (ARI/RPT) system and a manual reactor scram due to an invalid reactor water level signal that was created when safety tagging the Division 1 reactor water level reference leg backfill system for maintenance.

No commitments are made in this LER.

Should you have any questions or require additional information, please contact Mr. Ronald W. Gaston of my staff at (734) 586-5197.

Sincerely,

cc: NRC Project Manager  
NRC Resident Office  
Reactor Projects Chief, Branch 4, Region III  
Regional Administrator, Region III  
Supervisor, Electric Operators,  
Michigan Public Service Commission

JE22

NRR

<b>NRC FORM 366</b> (9-2007)		<b>U.S. NUCLEAR REGULATORY COMMISSION</b>		APPROVED BY OMB: No. 3150-0104 <small>Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NE0B-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.</small>			Expires 8/31/2010			
<h2 style="margin: 0;">LICENSEE EVENT REPORT (LER)</h2> <p style="margin: 5px 0 0 0;">(See reverse for required number of digits/characters for each block)</p>										
<b>1. FACILITY NAME</b> Fermi 2					<b>2. DOCKET NUMBER</b> 05000341		<b>3. PAGE</b> 1 OF 4			
<b>4. TITLE</b> Automatic Initiation of Alternate Rod Insertion and Manual Reactor Scram Due to Perturbations in the Reference Leg Backfill System										
<b>5. EVENT DATE</b>			<b>6. LER NUMBER</b>			<b>7. REPORT DATE</b>			<b>8. OTHER FACILITIES INVOLVED</b>	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
11	15	2007	2007	- 002	- 00	01	14	2008	FACILITY NAME	DOCKET NUMBER <b>05000</b>
<b>9. OPERATING MODE</b>  <div style="text-align: center; font-size: 24px;">2</div>			<b>11. THIS REPORT SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: (Check all that apply)</b>							
<b>10. POWER LEVEL</b>  <div style="text-align: center; font-size: 24px;">9%</div>			<input type="checkbox"/> 20.2201(b)		<input type="checkbox"/> 20.2203(a)(3)(i)		<input type="checkbox"/> 50.73(a)(2)(i)(C)		<input type="checkbox"/> 50.73(a)(2)(vii)	
			<input type="checkbox"/> 20.2201(d)		<input type="checkbox"/> 20.2203(a)(3)(ii)		<input type="checkbox"/> 50.73(a)(2)(ii)(A)		<input type="checkbox"/> 50.73(a)(2)(viii)(A)	
			<input type="checkbox"/> 20.2203(a)(1)		<input type="checkbox"/> 20.2203(a)(4)		<input type="checkbox"/> 50.73(a)(2)(ii)(B)		<input type="checkbox"/> 50.73(a)(2)(viii)(B)	
			<input type="checkbox"/> 20.2203(a)(2)(i)		<input type="checkbox"/> 50.36(c)(1)(i)(A)		<input type="checkbox"/> 50.73(a)(2)(iii)		<input type="checkbox"/> 50.73(a)(2)(ix)(A)	
			<input type="checkbox"/> 20.2203(a)(2)(ii)		<input type="checkbox"/> 50.36(c)(1)(ii)(A)		<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)		<input type="checkbox"/> 50.73(a)(2)(x)	
			<input type="checkbox"/> 20.2203(a)(2)(iii)		<input type="checkbox"/> 50.36(c)(2)		<input type="checkbox"/> 50.73(a)(2)(v)(A)		<input type="checkbox"/> 73.71(a)(4)	
<input type="checkbox"/> 20.2203(a)(2)(iv)		<input type="checkbox"/> 50.46(a)(3)(ii)		<input type="checkbox"/> 50.73(a)(2)(v)(B)		<input type="checkbox"/> 73.71(a)(5)		Specify in abstract below or in NRC Form 366A		
<input type="checkbox"/> 20.2203(a)(2)(v)		<input type="checkbox"/> 50.73(a)(2)(i)(A)		<input type="checkbox"/> 50.73(a)(2)(v)(C)		<input type="checkbox"/> OTHER				
<input type="checkbox"/> 20.2203(a)(2)(vi)		<input type="checkbox"/> 50.73(a)(2)(i)(B)		<input type="checkbox"/> 50.73(a)(2)(v)(D)						
<b>12. LICENSEE CONTACT FOR THIS LER</b>										
FACILITY NAME Robert J. Salmon – Principal Licensing Engineer								TELEPHONE NUMBER (Include Area Code) (734) 586-4273		
<b>13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT</b>										
CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	
<b>14. SUPPLEMENTAL REPORT EXPECTED</b> <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO						<b>15. EXPECTED SUBMISSION DATE</b>		MONTH	DAY	YEAR
<b>ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)</b>  At 03:13 EST November 15, 2007, during restart of the reactor, an initiation of the alternate rod insertion / recirculation pump trip (ARI/RPT) system occurred due to an invalid reactor water level 2 (Level 2) signal from the Division 1 reactor water level instrumentation. In response, control room operators placed the reactor mode switch to shutdown inserting a manual scram. When performing a safety tag-out of the Division 1 reactor water level reference leg, an operator first cracked the isolation valve open and then immediately closed the valve. This action caused a short pressure perturbation on the level instrumentation reference leg that initiated a false Level 2 Division 1 ARI/RPT system initiation, half-scram, and a reduction in feedwater flow. Due to the short duration of the false water level signal, the High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) systems operated properly and did not automatically initiate, nor was an automatic reactor scram initiated. The lowest reactor vessel water level reached was 183 inches above top of active fuel, and the standby feedwater pumps were placed in service to maintain reactor water level in the desired range. The cause of the event was attributed to a failure to adhere to procedures and a less than adequate pre-job brief. The Operations Manager met with each of the Operations shifts and set expectations for the use of human performance techniques as a means to reduce human errors. The Plant Manager met with all site personnel to review recent human performance events and to reinforce expectations. There were no safety consequences as a result of this event.										

## LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Fermi 2	05000341	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 4
		2007	-- 002 --	00	

## 17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

**Initial Plant Conditions:**

Mode 2  
Reactor Power 9 percent

**Description of the Event**

At 03:13 EST November 15, 2007, during the restart of the reactor from the twelfth refueling outage, an initiation of the alternate rod insertion/recirculation pump trip (ARI/RPT) system occurred due to an invalid reactor water level 2 (Level 2) signal from the Division 1 reactor water level instrumentation. A safety tag-out was needed on a valve external to the reactor water level reference leg backfill panel to ensure isolation of the backfill system during work on the panel. That valve was already closed as the Division 1 backfill system was not in operation at the time. The tag-out activity required an operator to verify that a system isolation valve, a small T-handle valve with no indication, was closed. When performing the tag-out, the assigned operator first verified that the isolation valve was closed by attempting to operate it in the closed direction to verify that the valve was closed. However, he was not confident the valve was closed. To assure himself that this valve was closed, the operator inappropriately cracked the isolation valve open and then immediately closed the valve. This action caused a short pressure perturbation on the level instrumentation reference leg that initiated a false reactor water Level 2 Division 1 ARI/RPT system initiation, half-scam, and a reduction in feedwater flow [SJ].

The ARI/RPT system functioned as designed. Within approximately 10 seconds of the ARI/RPT trip, the control room operators placed the reactor mode switch to shutdown inserting a manual scram in response to the trip of the recirculation pumps initiated by the ARI/RPT trip as directed by plant procedures. All control rods fully inserted into the core.

The main turbine [TA] was not in operation at the time of the event, and the turbine bypass valves were handling the reactor steam flow before and immediately following the reactor scram. At the time of the scram all emergency core cooling systems (ECCS) and Emergency Diesel Generators (EDGs) [DG] were operable. Due to the short duration of the false water level signal, the High Pressure Coolant Injection (HPCI) [BJ] and Reactor Core Isolation Cooling (RCIC) [BN] systems functioned normally and did not automatically initiate, nor was an automatic reactor scram initiated.

The lowest reactor vessel water level reached was 183 inches which is above reactor water level 3 (Level 3), and the standby feedwater pumps were placed in service to maintain reactor water level. With water being supplied by the standby feedwater system and with an increase in flow from the north reactor feedwater pump, a high level alarm and HPCI/RCIC reactor water level 8 (Level 8) trips were subsequently received. The operating north reactor feed pump was manually tripped to keep from overfeeding the vessel. Since there was little decay heat available coming out of the refueling outage, the main steam isolation valves (MSIV's) were manually closed at 03:49 hours to control the cool down rate.

Plant equipment was determined to respond as expected to the invalid low level signal and subsequent manual reactor scram.

## LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Fermi 2	05000341	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	3 OF 4
		2007	-- 002 --	00	

This event is being reported under 50.73(a)(2)(iv)(A), as an event or condition that resulted in manual actuation of the reactor protection system (RPS) [JD] that resulted in a reactor scram. Immediate notification was made to the NRC in accordance with 10 CFR 50.72 at 06:34 ET on November 15, 2007 (EN 43784).

**Cause of the Event**

Two root causes have been identified for this event. The nuclear operator performing the tag-out of the isolation valve for the Division 1 reference leg backfill system departed from training and procedural requirements for checking valve position. By opening B2100F241A, even fractionally, a pressure transient in the Division 1 reactor water level instrumentation reference line led to an initiation of Level 2 ATWS/ARI, a trip of both recirculation pumps and insertion of control rods. It was also determined that the pre-job brief was not adequate in that a human performance assessment of the task was not performed.

**Analysis of the Event**

The reactor responded as designed to the false reactor water Level 2 ARI/RPT signal. The ARI signal sealed in and energized the ARI solenoid valves which vented the scram air supply lines as designed. Both recirculation pumps [AD] and recirculation pump field breakers tripped in response to the ARI/RPT signal as designed. Expected primary containment isolation [JM] signals and actuations or partial actuations also occurred for the Division 1 Level 2 signal as expected, including isolation groups 2, 10, 12, 14, 16, 17, and 18.

In response to the false Level 2 signal, the control center heating and ventilation and air-conditioning (CCHVAC) systems shifted into recirculation mode, the reactor building ventilation system tripped, Division 1 standby gas treatment system automatically started, the Division 1 control air compressor automatically started, and secondary containment isolation dampers closed. All of these are expected actuations from a reactor water Level 2 signal.

The false water level transient was very short in duration. Only the RPS A1 trip system sensed the false level transient. Due to differences in RPS trip system response times, it was determined that the pickup of the A1 channel without the pickup of the corresponding B1 channel in response to a very short water level transient can be expected. These channel response times meet the overall RPS trip system response time requirements. Therefore, the reactor water Level 3 scram and related isolations did not occur because only RPS A1 channel tripped which can be expected as a result of the short false water level transient.

The HPCI and RCIC systems functioned normally and did not start in response to the false Level 2 signal. The duration of the Level 2 signal was determined to be too short to ensure the pick up and seal in of the system actuation relays for HPCI and RCIC systems. A signal was also sent to low pressure coolant injection (LPCI) loop select logic, but the loop selection functioned normally and did not complete for the same reason. Therefore, as a result of the short false water level transient, automatic startup of these systems did not occur and was not expected.

The plant response to the false level 2 signal was as expected and was enveloped by the recirculation pump trip transient described in the UFSAR. There was no challenge to the integrity of the reactor coolant system or the main steam system. The lowest reactor water level during the transient was measured to be 183 inches above top of active fuel which is above the reactor water Level 3 isolation and trip setpoint.

## LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Fermi 2	05000341	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	4 OF 4
		2007	-- 002 --	00	

The highest reactor pressure occurred prior to the event and at 934 psig is below the safety relief valve (SRV) setpoints, and no SRVs operated. Subsequent to the reactor trip, reactor pressure was adequately controlled using the main turbine bypass valves and trended downward. Reactor water level was controlled using the standby feedwater system. Since the reactor was only operating at 9% power prior to the event, and with little decay heat available due to the limited operating history after the refueling outage, the transient was mild. Since the ARI/RPT and reactor protection systems performed as designed, and the plant response was enveloped by the UFSAR transient analyses, there were no safety consequences as a result of this event.

**Corrective Actions**

The plant manager performed a human performance stand-down session for all plant employees to discuss this and other human performance events and expectations. The Operations Manager also met with each of the Operations shifts and set expectations for the use of human performance techniques as a means to reduce human errors.

This event is documented and evaluated in the Fermi 2 corrective action program. Other actions are being planned to address this event. These actions will be tracked and implemented by the corrective action program.

**Additional Information**

A. Failed Components: None.

B. Previous LERs on Similar Problems:

There have been no events involving perturbations in a reactor water level reference leg in the last 5 years.